State/Industry Ambient Monitoring Network

Air Quality Report

4th Quarter 2006

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Air Quality Monitoring Branch Division of Air Quality North Dakota Department of Health

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SECTION ONE

DISCUSSION OF

MONITORING RESULTS

Sulfur Dioxide (SO₂)

There were no exceedances of either the state or the federal standards during the quarter. The maximum 1-hour concentration was 63 ppb on December 31 at Lostwood NWR; the maximum 3-hour concentration was 45 ppb on December 11 at DGC #14; and, the maximum 24-hour concentration was 12 ppb on December 11 at DGC #14. The highest arithmetic mean was 1.8 ppb at Bismarck Residential. All sites with exception of Hess - Tioga #3 achieved at least an 80% data recovery for the period operated.

Hess - Tioga #3 failed to achieve 80% data recovery due to equipment failure.

Sulfur Dioxide (SO₂) 5-Minute Average

The maximum 5-minute concentration was 212 ppb on October 5 at Bear Paw - MGP #5. All sites with exception of Hess - Tioga #3 achieved at least an 80% data recovery for the period operated.

Hess - Tioga #3 failed to achieve 80% data recovery due to equipment failure.

Trace Level Sulfur Dioxide (SO₂)

There were no exceedances of either the state or the federal standards during the quarter. The maximum 1-hour concentration was 5.0 ppb on November 3 at Fargo NW; the maximum 3-hour concentration was 3.7 ppb on November 3 at Fargo NW; and, the maximum 24-hour concentration was 1.3 ppb on October 26 at Fargo NW. The highest arithmetic mean was 0.4 ppb at Fargo NW. The site achieved at least an 80% data recovery for the period operated.

Trace Level Sulfur Dioxide (SO₂) 5-Minute Average

The maximum 5-minute concentration was 7.6 ppb on November 3 at Fargo NW. The site achieved at least an 80% data recovery for the period operated.

Ozone (O_3)

There was no exceedance of the ozone standard during the quarter. The highest observed 1-hour concentration was 55 ppb on October 1 at TRNP-NU. The highest 4th highest 8-hour concentration was 41 ppb on November 22 at TRNP - NU. All sites achieved at least an 80% data recovery for the period operated.

Nitrogen Dioxide (NO₂)

The highest observed 1-hour concentration was 41 ppb on October 18 at TRNP - NU. The maximum arithmetic mean concentration was 7.7 ppb at Bismarck Residential. All sites achieved at least an 80% data recovery for the period operated.

Ammonia (NH₃)

The highest 1-hour concentration was 127.2 ppb on November 17 at Beulah - North . The site achieved an 80% data recovery for the period.

The data is used as part of the ambient data input used by the newer dispersion models.

Inhalable Continuous PM_{2.5} Particulates

There was no exceedance of the 24-hour standard during the quarter. The highest 24-hour concentration was $14.0~\mu g/m^3$ on November 22 at Fargo NW. The highest arithmetic mean concentration was $5.4~\mu g/m^3$ at Hannover. All sites achieved at least an 80% data recovery for the period operated.

Inhalable PM_{2.5} Particulates

There was no exceedance of the 24-hour standard during the quarter. The highest 24-hour average concentration was $20.2 \,\mu\text{g/m}^3$ on November 22 at Fargo NW. The highest arithmetic mean was $7.0 \,\mu\text{g/m}^3$ at Fargo NW. All sites with the exception of TRNP - NU achieved at least an 80% data recovery for the period.

TRNP - NU failed to achieve 80% data recovery due to equipment failure.

Inhalable Continuous PM₁₀ Particulates

There was no exceedance of the 24-hour standard during the quarter. The maximum 24-hour concentration was 55.2 $\mu g/m^3$ on October 2 at Fargo NW. The highest arithmetic mean was 15.3 $\mu g/m^3$ at Fargo NW. All sites achieved an 80% data recovery for the period.

SECTION TWO

AMBIENT AIR QUALITY DATA

SUMMARIES

TRNP - NU

2006 OCT-DEC

2195

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POLLUTANT : Sulfur Dioxide (ppb) M A X I M A 1 - HOUR 3 - HOUR 24 - HOUR SAMPLING 2ND 1ST 2ND 1ST 2ND ARITH LOCATION YEAR PERIOD MM/DD:HH MM/DD:HH MM/DD:HH MM/DD MM/DD MEAN #>273 #>99 Bear Paw - MGP #3 2006 OCT-DEC 2184 5 3.7 6 1.1 12/02:18 12/02:17 12/02:20 12/02:17 12/02 12/05 2183 5.9 Bear Paw - MGP #5 2006 OCT-DEC 15 14 6 3 1.1 10/05:11 10/05:10 10/05:11 12/02:17 12/02 10/05 Beulah - North 2006 OCT-DEC 2183 25 8 19 16 3 1.4 11.2 12/11:04 12/10:23 12/11:05 12/10:23 12/11 12/28 Bismarck Residential 2006 OCT-DEC 2193 23 15 14 1.8 23.7 12/04:11 12/22:16 12/22:17 11/19:14 12/04 12/22 DGC #12 2006 OCT-DEC 2186 38 28 19 10 1.5 14.3 12/11:04 12/11:05 12/11:05 12/28:11 12/11 10/13 DGC #14 2006 OCT-DEC 2187 19 12 11.9 45 45 1.5 12/11:07 12/11:08 12/11:08 12/11:11 12/11 12/16 DGC #16 2006 OCT-DEC 2186 34 21 9.8 11 1.4 12/11:07 11/03:22 12/11:08 11/03:23 12/11 11/27 DGC #17 2006 OCT-DEC 2195 46 37 34 21 7 1.3 6.4 12/11:07 12/11:08 12/11:08 11/27:05 11/27 12/11 Dunn Center 2006 OCT-DEC 2144 16 16 15 1.1 4.8 12/11:05 12/11:03 12/11:05 12/11:02 12/11 11/23 Hannover 2006 OCT-DEC 2189 47 34 30 1.5 12.2 10/29:19 12/27:12 10/29:20 11/25:14 11/25 10/29 Hess - Tioga #1 2006 OCT-DEC 2159 25 15 14 1.5 11.3 10/01:02 11/20:06 12/18:20 10/01:02 12/29 12/06 2194 Lostwood NWR 2006 OCT-DEC 6.3 5.3 41 2.5 1.0 1.0 1.7 16.3 12/31:07 12/31:06 12/31:08 12/31:05 12/31 12/02

7

12/10:14 12/10:12 12/10:14 11/23:05 12/10 11/23

2

1.1

4.9

POLLUTANT : Sulfur Dioxide (ppb)

LOCATION	SAMPLING NU YEAR PERIOD OB			
TRNP - SU	2006 OCT-DEC 219	9 8 8 12/10:19 12/10:18 12/10:20	3 2 1 1.0 0 12/10:23 12/10 10/02	0.9

The highest 1-hour concentration is 63 ppb at Lostwood NWR on 12/31:07 The highest 3-hour concentration is 45 ppb at DGC #14 on 12/11:08 The highest 24-hour concentration is 12 ppb at DGC #14 on 12/11 The highest arithmetic mean is 1.8 ppb at Bismarck Residential

* The air quality standards are:

STATE Standards -

- 1) 273 ppb maximum 1-hour average concentration.
- 2) 99 ppb maximum 24-hour average concentration.
- 3) 23 ppb maximum annual arithmetic mean concentration.

FEDERAL Standards -

- 1) 500 ppb maximum 3-hour concentration not to be exceeded more than once per year.
- 2) 140 ppb maximum 24-hour concentration not to be exceeded more than once per year.
- 3) 30 ppb annual arithmetic mean.

^{***} Less than 80% of the possible samples (data) were collected.

POLLUTANT : Sulfur Dioxide 5-Minute Averages (ppb)

		5 (FF)		5 - M I N U T E M A X I M A									
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST	DATE MM/DD:HH	2ND	DATE MM/DD:HH	3RD	DATE MM/DD:HH	# HOURS >600	% >MDV		
Bear Paw - MGP #3	2006	OCT-DEC	2184	16	11/08:16	11	12/05:14	10	12/02:17	0	9.6		
Bear Paw - MGP #5	2006	OCT-DEC	2183	212	10/05:11	140	10/05:10	19	11/21:12	0	21.4		
Beulah - North	2006	OCT-DEC	2183	54	12/11:04	44	12/10:22	37	12/11:03	0	19.5		
Bismarck Residential	2006	OCT-DEC	2028	61	12/04:11	48	12/22:16	41	10/28:11	0	34.6		
Dunn Center	2006	OCT-DEC	2144	26	12/10:11	22	11/23:02	22	11/23:03	0	12.2		
Hannover	2006	OCT-DEC	2189	81	11/25:14	72	10/29:19	71	12/27:13	0	21.4		
Hess - Tioga #1	2006	OCT-DEC	2159	93	10/01:02	93	11/20:06	78	12/15:15	0	17.0		
Lostwood NWR	2006	OCT-DEC	2194	78	12/31:07	72	12/31:06	54	12/03:00	0	23.2		
TRNP - NU	2006	OCT-DEC	2195	16	10/07:09	12	12/10:13	12	12/10:14	0	10.8		
TRNP - SU	2006	OCT-DEC	2191	25	11/21:08	24	12/30:04	10	12/10:19	0	4.0		

The maximum 5-minute concentration is 212 ppb at Bear Paw - MGP #5 on 10/05:11

^{*} No Standard is currently in effect
*** Less than 80% of the possible samples (data) were collected.

POLLUTANT : Trace Level Sulfur Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - 1ST MM/DD:HH		A X 3 - 1ST MM/DD:HH	HOUR 2ND	1ST	HOUR 2ND ARI MM/DD ME		24HR #>99	% >MDV
Fargo NW	2006	OCT-DEC	2189	5.0 11/03:09	4.7 11/18:11	3.7 11/03:11	2.1 12/27:14	1.3 10/26	1.0 0	. 4		78.8

The highest 1-hour concentration is 5.0 ppb at Fargo NW on 11/03:09 The highest 3-hour concentration is 3.7 ppb at Fargo NW on 11/03:11 The highest 24-hour concentration is 1.3 ppb at Fargo NW on 10/26 The highest arithmetic mean is 0.4 ppb at Fargo NW

* The air quality standards are:

STATE Standards -

- 1) 273 ppb maximum 1-hour average concentration.
- 2) 99 ppb maximum 24-hour average concentration.
- 3) 23 ppb maximum annual arithmetic mean concentration.

FEDERAL Standards -

- 1) 500 ppb maximum 3-hour concentration not to be exceeded more than once per year.
- 2) 140 ppb maximum 24-hour concentration not to be exceeded more than once per year.
- 3) 30 ppb annual arithmetic mean.

COMPARISON OF AIR QUALITY DATA WITH THE NORTH DAKOTA AMBIENT AIR OUALITY STANDARDS *

POLLUTANT: Trace Level Sulfur Dioxide 5-Minute Averages (ppb)

					5 -	- M I N	UTE 1	1 A X I	M A		
		SAMPLING	NUM	1ST	DATE	2ND	DATE	3RD	DATE	# HOURS	용
LOCATION	YEAR	PERIOD	OBS		MM/DD:HH		MM/DD:HH		MM/DD:HH	>600	>MDV
Fargo NW	2006	OCT-DEC	2189	7.6	11/03:09	6.4	12/27:12	6.2	11/03:10	0	91.3

The maximum 5-minute concentration is 7.6 ppb at Fargo NW on 11/03:09

^{*} No Standard is currently in effect:

POLLUTANT : Ozone (ppb)

TOBBOTANT . OZONE (PPD)				1 -	M HOUR	A X	8	- HOUR			
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST MM/DD	2ND MM/DD	1ST MM/DD	2ND MM/DD	3RD MM/DD	4TH MM/DD	1HR #>120	8HR #>80
Beulah - North	2006	OCT-DEC	2186	49 10/01	45 10/29	45 10/01	40 11/22	39 10/02	38 11/08		
Bismarck Residential	2006	OCT-DEC	2190	46 10/29	44 10/01	41 10/01	35 10/02	34 10/15	34 10/05		
Dunn Center	2006	OCT-DEC	2190	48 10/01	40 10/29	43 10/01	36 11/22	35 10/29	35 11/08		
Fargo NW	2006	OCT-DEC	2190	48 10/07	46 10/06	44 10/07	40 10/06	37 12/31	32 10/01		
Hannover	2006	OCT-DEC	2065	48 10/01	41 11/22	45 10/01	42 10/02	39 11/22	37 12/21		
Lostwood NWR	2006	OCT-DEC	2193	49 10/01	39 10/26	44 10/01	35 10/26	35 10/02	35 12/06		
TRNP - NU	2006	OCT-DEC	2196	55 10/01	44 11/22	51 10/01	41 11/22	41 10/15	41 12/13		
TRNP - SU	2006	OCT-DEC	2191	54 10/01	53 10/29	53 10/01	51 10/02	47 10/29	41 11/22		

The highest 1-hour concentration is 55 ppb at TRNP - NU on 10/01 The 4th highest 8-hour concentration is 41 ppb at TRNP - NU on 12/13

FEDERAL - Fourth highest daily maximum 8-hour averages for a 3-year period not to exceed 80 ppb.

^{*} The air quality standards for ozone are: STATE - 120 ppb not to be exceeded more than once per year.

POLLUTANT : Nitrogen Dioxide (ppb)

POLLUTANT : Nitrogen Dioxide (ppb)				M A X	I M A HOUR		
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST MM/DD:HH	2ND MM/DD:HH	ARITH MEAN	% >MDV
Beulah - North	2006	OCT-DEC	2181	23 12/11:20	21 12/11:19	2.3	85.6
Bismarck Residential	2006	OCT-DEC	2178	36 12/20:17	34 11/02:19	7.7	100.0
DGC #12	2006	OCT-DEC	2186	25 12/11 : 20	23 12/11:19	2.4	90.0
DGC #17	2006	OCT-DEC	2187	19 10/25 : 18	19 12/11:07	1.5	66.4
Dunn Center	2006	OCT-DEC	1872	14 12/11:00	14 12/11:05	1.1	57.5
Fargo NW	2006	OCT-DEC	2182	34 12/04:19	31 12/04:18	5.8	95.0
Hannover	2006	OCT-DEC	2016	24 12/27 : 12	21 11/02:22	2.0	87.5
Lostwood NWR	2006	OCT-DEC	2188	25 12/31:07	21 12/31:06	1.5	66.0
TRNP - NU	2006	OCT-DEC	2189	41 10/18:12	12 11/23:04	1.0	47.8

The highest 1-hour concentration was 41 ppb at TRNP-NU on 10/18:12 The maximum Arithmetic Mean concentration is 7.7 ppb at Bismarck Residential

FEDERAL - 53 ppb annual arithmetic mean.

^{*} The air quality standards are: STATE - 53 ppb maximum annual arithmetic mean.

POLLUTANT : Ammonia (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST MM/DD:HH	2ND	M A X 1 - 3RD MM/DD:HH	HOUR 4TH	5TH	6TH MM/DD:HH
Beulah - North	2006	OCT-DEC	2167	127.2 11/17:11		84.8 11/17:12	70.6 11/16:23	68.3 11/17:02	67.4 10/24:09

COMPARISON OF AIR QUALITY DATA WITH THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable Continuous PM_{2.5} Particulates (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - 1ST MM/DD:HH	M A HOUR 2ND MM/DD:HH	X I 1ST MM/DD	M A 2ND MM/DD	24 - HO 3RD MM/DD	OUR 4TH MM/DD	ARITH MEAN	24HR #>65	AM>15
Beulah - North	2006	OCT-DEC	2139	56.3 10/24:10	29.2 11/10:15	10.4 10/16	9.2 10/24	9.1 10/02	8.8 10/25	4.1		
Bismarck Residential	2006	OCT-DEC	2187	34.5 10/29:21	29.4 11/12:13	8.3 11/15	8.1 10/16	7.4 10/24	7.1 10/29			
Dunn Center	2006	OCT-DEC	2182	19.0 10/16:17	18.0 10/16:18	6.0 10/16	6.0 10/01	5.8 10/02	5.3 11/10			
Fargo NW	2006	OCT-DEC	2188	64.9 11/22:19	44.5 11/22:20	14.0 11/22	10.3 11/18	9.5 10/02	9.2 10/07	4.1		
Hannover	2006	OCT-DEC	2181	35.2 11/12:10	30.7 11/08:05	10.6 10/16	9.5 10/02	9.0 10/25	8.8 11/12			
Lostwood NWR	2006	OCT-DEC	2188	14.2 10/07:10	14.2 10/07:12	7.0 10/07	6.4 10/25	6.4 10/01	5.2 10/16			
TRNP - NU	2006	OCT-DEC	2191	15.6 10/02:08	12.1 11/14:20	5.5 10/01	5.4 10/02	5.1 10/16	4.7 12/11	1.9		
TRNP - SU	2006	OCT-DEC	2157	26.4 10/02:09	21.1 10/02:07	13.1 10/02	8.9 10/16	8.3 12/28	7.4 10/01			

The highest 24-hour concentration is $~14.0~\mu g/m3$ at Fargo NW on 11/22 The highest Annual Mean concentration is $~4.8~\mu g/m3$ at TRNP - SU

- 1) 24-hour: 3-year average of 98th percentiles not to exceed 65 μ g/m³. 2) Annual: 3-year average not to exceed 15 μ g/m³.

COMPARISON OF AIR QUALITY DATA WITH

^{*} No Standard is currently in effect:

^{*} The ambient air quality standards are: FEDERAL Standards -

THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable $PM_{2.5}$ Particulates ($\mu g/m^3$)

POLLUTANT : Innalable PM _{2.5} Particulates	M A X I M A 24 - HOUR												
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#> 65 AM>15	% >MDV			
Beulah - North	2006	OCT-DEC	16	1.1	6.6 10/02	6.5 12/31	6.1 10/20	3.5		81.3			
Bismarck Residential	2006	OCT-DEC	27	1.5	11.4 12/28	9.8 11/04	8.8 12/07	5.1		92.6			
Fargo NW	2006	OCT-DEC	31	1.0	20.2 11/22	16.8 10/26	13.1 11/04	7.0		90.3			
TRNP - NU	2006	OCT-DEC	8	1.3	6.1 10/02	4.3 12/01	3.3 11/21	2.7		62.5			
TRNP - SU	2006	OCT-DEC	16	1.3	7.2 10/02	5.8 10/20	4.8 11/25	3.0		81.3			

The highest 24-hour concentration was 20.2 $\mu g/m3$ at Fargo NW on 11/22 The highest annual mean concentration was 7.0 $\mu g/m3$ at Fargo NW

- * The ambient air quality standards are: FEDERAL Standards 1) 24-hour: 3-year average of 98th percentiles not to exceed 65 μ g/m³. 2) Annual: 3-year average not to exceed 15 μ g/m³.

^{***} Less than 80% of the possible samples (data) were collected.

POLLUTANT : Inhalable Continuous PM_{10} Particulates $(\mu g/m^3)$

				1	M A	X I	M A	24 — HO	OLLD.			
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - 1ST MM/DD:HH	- HOUR 2ND MM/DD:HH	1ST MM/DD	2ND MM/DD	24 — HO 3RD MM/DD		RITH MEAN	24HR #>150	AM>50
Beulah - North	2006	OCT-DEC	2186	96.0 10/11:16	65.0 12/02:01	20.4	19.9 10/16	19.7 10/02	19.1 12/02	10.0		
Bismarck Residential	2006	OCT-DEC	2185	96.0 10/11:18	77.0 10/30:10	27.1 11/04	23.9 12/21	23.4 12/19	22.3 11/22	12.9		
Dunn Center	2006	OCT-DEC	2182	92.0 11/08:10	82.0 11/08:09	23.1 11/08	18.9 11/14	17.8 12/01	17.5 12/27	9.3		
Fargo NW	2006	OCT-DEC	2187	267.0 11/22:19	165.0 10/02:15	55.2 10/02	52.2 11/22	41.1 10/06	40.3 10/09	15.3		
Lostwood NWR	2006	OCT-DEC	2188	45.0 12/16:15	44.0 12/06:07	19.6 12/16	15.0 10/01	14.2 12/01	14.0 10/02	7.4		
TRNP - NU	2006	OCT-DEC	2191	53.0 11/30:16	47.0 11/29:07	19.6 11/29	17.8 11/23	14.3 11/28	13.7 11/30	7.8		

The highest 24-hour concentration is $~55.2~\mu g/m3$ at Fargo NW on 10/02 The highest Annual Mean concentration is $~15.3~\mu g/m3$ at Fargo NW

^{*} The STATE and FEDERAL air quality standards are: 1) 150 $\mu g/m^3$ maximum averaged over a 24-hour period with no more than one expected exceedance per year. 2) 50 $\mu g/m^3$ expected annual arithmetic mean.

SECTION THREE

EXCEEDANCE LISTINGS

By Site Date Hour

All Units Are in Parts Per Billion Except Wind Direction (Degrees), Wind Speed (MPH), CO (PPM), and $PM_{2.5}$ and PM_{10} ($\mu g/m^3$)

The * Identifies the Exceedances

NONE

By Date Hour Site

All Units Are in Parts Per Billion Except Wind Direction (Degrees), Wind Speed (MPH), CO (PPM), and $PM_{2.5}$ and PM_{10} ($\mu g/m^3$)

The * Identifies the Exceedances

NONE